UDC 711

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RESISTANCE OF PLANNED OLD TOWN: A CASE STUDY OF TAINAN, TAIWAN

Abstract: *According to Growth Pole Theory, the development dynamics in the urban area is much larger than rural. Practically, an urban plan is expected for the development with growth as well. However, in large cities, especially in the old town, a modernised urban planning does not usually lead to the overall development but cause the deformed land, leads to the difficulties of constructions. As study case, Tainan, the oldest city in Taiwan, is observed in four periods. Firstly, since the building of the city wall in 1725, Tainan had been the former capital and the most important of trading ports in Taiwan. In this period the urban tissue was based on the narrow alleyways connected to the city gates, high streets, ports and officials' offices. Secondly, since 1920, the wall has been demolished, and alleyways were transformed into the "boulevards" with orthogonal intersection and traffic circles, which were reconstructed for hygiene and military reasons. Thirdly, since 1938, urban planning with the concept of a combination of land-use planning, land subdivision and construction management was implemented. In this period, new buildings such as shophouses with arcades, markets and galleries were planned as leading types (but only on the street side). The city hall, the fire stations, the police stations and the weather observatory were established for public services. Lastly, in the period of post-war modernism, the zoning system as one of the important planning instruments was expected for not only clean-sweep planning but also for the urban renewal. Nevertheless, only less than one thousand building sites for the new construction can be found in the past 20 years and the most of them are shophouses. The more than 400-year development in Tainan shows the persistence of urban formation, regardless of planning technologies. Although redundant conditions were forcedly added onto the original tissue directly and the urban blocks were subdivided, the historical stratification can be systematically observed and formed as the urban landscape for the old town regeneration.*
Keywords: *urban formation resistance, historical stratification, urban landscape, old town, Tainan.*

Introduction

A modern urban plan is a tool for development with growth. According to growth pole theory, the development dynamics in the urban area is much larger than rural. However, a contradiction shows in an old town. Except for land price and ownership, a modernised urban planning does usually not lead to the overall development but cause the deformed land make an old town cannot grow as expected.

One of the axioms of micro-scale morphology tells the updated status to contain the structural phenomenon of earlier status (Raith, 2000). Urban forms will continue to exist, accumulate or adapt without giving some particular methods to remove the building lot conditions. In addition, planning instruments and methodologies change dramatically, and different instruments implement without coordination and cooperation will obstruct the urban development systematically. These cause the persistence of the old town and difficult to achieve the vision of the urban plan. This study focuses on blocks and aims to clarify and understand how the historical stratification affects the urban redevelopment under the current mechanism of "urban architecture" in Taiwan.

Taiwan, formerly known as Formosa, is located in the East Asian Route in the Age of Discovery (See figure 1). European countries established several trade positions from the Indian subcontinent to Japan, such as Jakarta, Java, Luzon, Macau and Nagasaki. These cities started

forming a city based on the colonial trading and governing; Tainan was one of these colonies. In the mid-16th century, Verenigde Oost-Indische Compagnie established Fort Zeelandia and Fort Provintia beside Former Taijiang Inland Sea, and build the first planned high street connected the trading port and Fort Provintia.

Although cities and settlements on Taiwan exist almost thousands years, the official ordered walled city established not until 1725. Kangxi Emperor of China attacked and obtained Taiwan in 1683, so the walled city of Tainan was built up as a port city with ancient Chinese Style. Taijiang Inland Sea was no longer existed but remained a trading port and several canals for Shanpan boat. We can say that this is the foundation city (German: Grundungstadt) of Tainan.

Figure 1. Location of Tainan as a colony in the age of discovery
Source: authors draw refer to Lithographic Taiwan (1623), JOSH tw (2010), Vingboons, J. (1640)

Since the end of the 19th century, Japanese Empire and the Republic of China governed Taiwan and modernised the cities by the most advanced planning instruments rapidly at that time. These two governing authorities' cultural backgrounds are not in the same stream, so the conflicts of the instruments merely significantly and become the typical issue of old town redevelopment. This study takes the oldest city Tainan as a case, observes the urban blocks to discuss the resistance of planned old town caused by the conditions forcedly added on the original tissue. By understanding the reason for these phenomena, we look forward to facing this problem and try to react wisely in the future.

Methodology

This study expounds the "morphological frame" of Taiwan on the aspect of urban redevelopment. The constraints of urban development conclude in natural and humanmade structure, such as topographic, plot and street patterns (Conzen, 1960; Tarbatt, 2012). According to Conzen's approach, an urban block as an element of the town-plan can be considered as a humanmade physical structure and restrict the urban development, especially in an old town (Niković, Đokić, & Marić, 2014). Since Tainan locates on the seaside of a flooding plain and its terrain drop less than 20 meters by 2 kilometres away, we focus only on its built environment.

The mechanism of "urban architecture" in Taiwan can be categorised into three parts (see figure 2). One is "urban planning" considering the urban activities as a system and its built environment on a relatively large scale. The second is "construction management" mainly considering the living quality and fire safety of each building lot. The third is "land management" which considering only the land ownership and registration in the urban area. These three-part frames the built environment together but authorised by different agencies. This study clarifies how historical stratification acts on each of them by town-plan analysis and shows the forms of urban blocks.

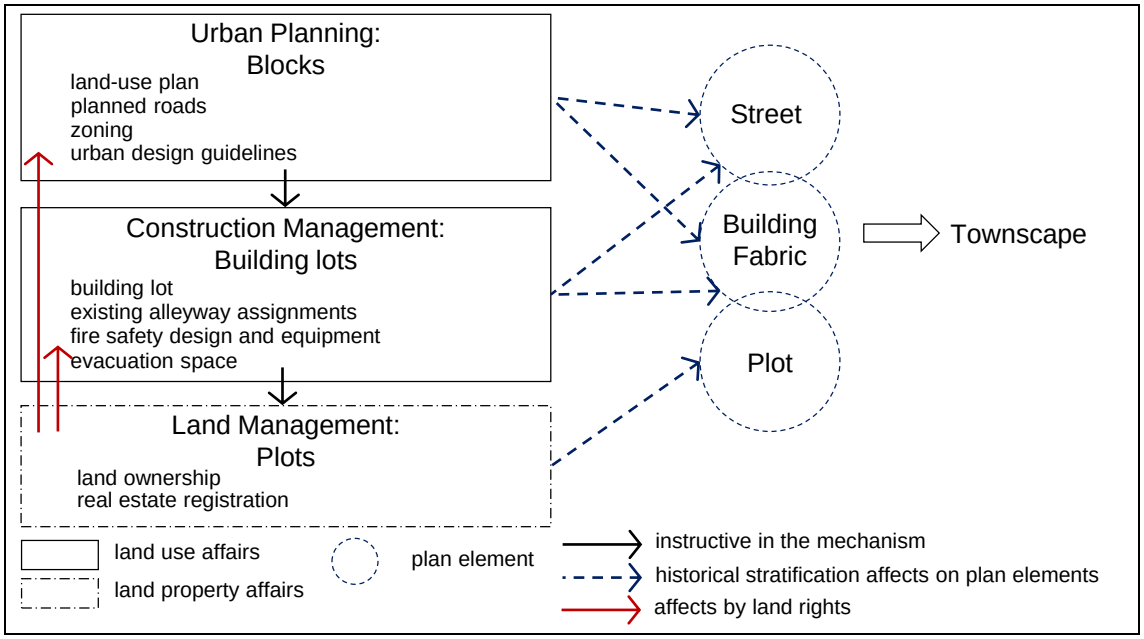

Figure 2. Mechanism of "urban architecture" in Taiwan
Source: authors draw refer to *Building Act* and *Urban Planning Law*

Measurement and analysis

Case Study of Tainan Old Town

Tainan is the most typical old town in Taiwan, and it ultimately ran through all the morphological periods. Many port cities located on the west coast of the island such as Tamshui, Lukang, Yenshui and Beidou, but only Tainan owned the official permit to build the city wall. As the formal capital until the 19th century and without a high pressure of development, the morphological frame of Tainan made up of four morphological periods is still observable. These four periods mention as the foundation of the city and the change of planning instruments in current 300 years.

Phase 1: "Prefecture City" – an ancient Chinese port city during 1725 to the 1920s

Taiwan was a part of Qing dynasty of China during 1683 to 1895, so the foundation of the city of Tainan was a port city in a Chinese style. The high streets formed in the Dutch Formosan Era. Since the land transport was inefficient without motor vehicles and bridges, shipping played an important role even the domestic transportation. However, Taijiang Inland Sea silted partly, the merchant ship cannot sail to Fort Provintia anymore while the city wall was built. Therefore, the merchant had to transfer their goods by shanpan boats and sail into the high street through "old five channels".

Tainan was the capital city of Taiwan before 1887 Fukien-Taiwan Province Established, so there was not the only trading port, high street but also lots of bureaucrat offices, academies of classical learning and military facilities inside or nearby the city wall. See Figure 3a. The city wall built along the former coastline and the topography. The city in the wall was mainly structured by the high streets, mainly the east-west high street connected the east gate and the former trading port and another two shorter high streets connected to administration offices and military facilities. Military facilities, academies of classical learning were mainly built up in the undeveloped edges, some of them were on the west side of the wall near the coast, and most of them were naval base or arsenal. The standard transport was the horse- or ox-drawn wagons and sampan boat, so the streets remained narrow and turned in an organic shape.

Phase 2: "shikukaisei" in the 1920s – paradigm form travaux haussmanniens

Taiwan was ceded to Japanese Empire according to Treaty of Shimonoseki signed after First Sino-Japanese War in 1895. Japan tried to learn everything from western countries, including industries and town planning. The governing authority that time learnt form travaux haussmanniens in Paris and implement "shikukaisei" project in Tainan. This project demolished most of the city walls and gates and transformed the narrow alleyways into "boulevards" with orthogonal intersections and traffic circles for hygiene and military reasons; also set up the train station and other public facilities.

The "shikukaisei" engineering remains three key points. First, as Le Corbusier mentioned in Urbanisme (1924), this project was a surgery, aim to provide the mobility of Tainan. See figure 3b. Five main roads and five traffic circles were built and cut through the centre of the city. These new roads wide up to 15 to 22 meters, in the early 20th century, they are vast roads. Second, this project adds the "modernised public facilities", like prefecture hall, city hall, fire stations, hospital, weather observatory, water and sewer system for public services; also police stations, prison, military bases and arsenals for the governing needs. The third one is the reforming of the street façade and marketplace. The house nearby the new roads was rebuilt as the townhouses, and their width is usually less than 5 meter to struggle the most space for the store. Modern marketplaces with better drainage system also can find behind those townhouses.

This surgery drastically transformed Tainan forms an ancient Chinese city to a modernised city in the 20th century. However, even if the authoritarian government actively promotes the project, the resistance of Tainan was shown on the plan. The model of "shikukaisei" was to open up the broad and straight main road with orthogonal intersections, but the new roads in Tainan were not that straight. The project still had to fit in the original high street and city walls, and the facilities were mostly located on the edge of the old town or the former sites of bureaucrat offices.

Phase 3: Taiwan Urban Planning Order in 1938 – the era of land use plan

Since the governing authority announced "Taiwan Urban Planning Order" in 1938, the planning instrument renewed again. This instrument combines the concept of land-use planning, land subdivision and construction management, and can understand as a combination of "deciding the limitation of construction" and "improving the site conditions". In this period, many new towns like Kaohsiung, Taichung, Huwei, were established. Those new towns usually

contain urban blocks with small grids, neatly arranged rectangle plots and several green parks for citizens. New buildings such as shophouses with arcades, markets and galleries were planned as leading types.

However, Tainan, as a historical town, the effect of this new instrument was not very significant. See figure 3c. The inner city structure was defined in the previous period and just added to the land-use plan and construction regulations on the inner city blocks. The most significant changes are the parkway system around the city, and the new area was planned to develop. Without improving the site conditions in the old town, people built their buildings in the most convenient way follow the original tissue made the townscape inconsistent.

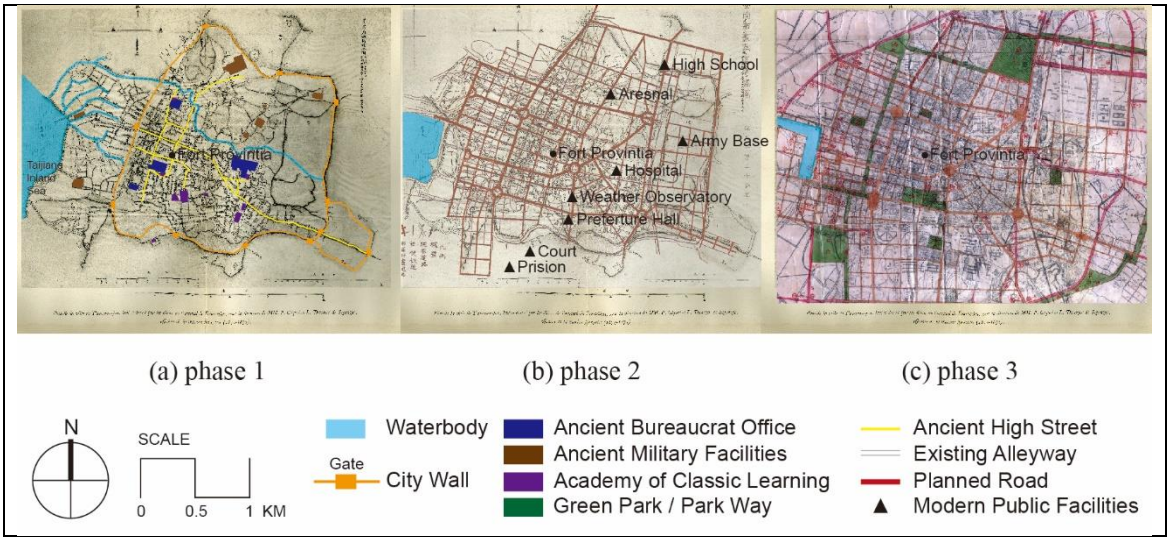

Figure 3. Morphological Periods of Tainan City
Source: authors draw refer to Center for GIS, RCHSS, Academia Sinica (1941), Giquel, M.M.P., Dunoyer de Segonzac, L., The students of the Fou-tchéou dockyard. (cartographer) (1874-1875), Tainan Prefecture, Taiwan, Japan. (cartographer) (1911)

Phase 4: post-war modernism since the 1970s

The Republic of China occupied and governing Taiwan since the end of Second World War in 1945. The Republic of China is a member of Western Bloc, so the construction and planning methods tent to plan for the automobile after WWII. Since the Chinese governing system was incompatible with the Japanese one, especially the land management and planning instrument, most of the order or law still used until the 1970s. In the late 1960s, the governing authority applied advisory group from UN for the help of urban and housing development. The advisors mainly came from western countries helped and taught Taiwanese people formulating “the most advanced” urban plan, established a faculty in college and suggested to modify Urban Planning Act and Building Act (Schinz, 1989).

After amended of Building Act and Urban Planning Act in 1973, the planning instrument fully enters “the era of automobile”. In this period, each building site required at least one road connection. If a site connected to a narrow existing alleyway, the site shall setback four to six meters (see Table 1) to broaden it. This mechanism is set for emergency and firefighting but also cause much more deformed land that cannot construct any building.

In this period, the planning instrument expects the clean-sweep renewal, planned-unit development or overall development, however, it does not work as well. Only less than one thousand building sites for the new construction can be found in the past 20 years, and the most of them are shophouses. It entirely runs counter to the purposes of urban planning.

Table 1

Setback regulations for the site connected to existing alleyways

setback width	conditions
equally setback to 4 meters	dead end road shorter than 40 meters or the other shorter than 80 meters
equally setback to 6 meters	dead end road longer than 40 meters or the other longer than 80 meters
keep the original width	the existing alleyway wider than the above conditions

Source: authors collect refer to *Construction Management Regulations of Tainan City*

Conceptual Types of Urban Blocks in Tainan

Figure 4 is the identified urban blocks follow the current laws and regulations. The boundaries are the restrictions of size and shape to a building site, also indicates the difficulties of overall development. Comparing to 192 blocks drawn on land-use plan, the count of urban is up to 678, and the block form is much more fragmentary. Only 5.6% of blocks match to the land-use plan, and up to 593 blocks (87.46%) contains existing alleyway in their side (see Table 2).

Then, this study describes urban blocks by "size", "shape" and "plot subdivision". Size is measured by area (unit: square meter); the shape is measured by "shape index (SHI)[1]"; plot subdivision is measure by "plot counts per square meter". The bigger, simpler shape and less plot subdivided blocks have much more trend to overall construction, vice versa.

After that, this study establishes the eight conceptual types of urban blocks using Weber's (1949) and Udy's (1958) Methods by dichotomising three concepts according to their median. Of all these 678 blocks are categorised into eight types (see Table 3). Type I means the blocks have loose restrictions on overall development and much easy to have new constructions. Type II means the plot of the blocks are over subdivided, but they still have potential to consolidate due to the larger size and simple shape. Type III means the smaller blocks with the simple shape and less plot subdivided. They may tend to renewal but difficult to construct the large building volume. Type IV means the shape is much more complicated and might influence the site planning although having a large size and less plot subdivision. Type V means the blocks with a simple shape and easy to overall development but do not tend to renewal due to their small size and complex plot subdivision. Type VI means the block with less plot subdivision only and simply to accumulate in the recent form. Type VII means the block with large size and tends to consolidate and construct the large building volume while facing the developing pressure. Type VIII means all the conditions are severed and have difficulties to overall development.

According to Table 3, almost 70% area of blocks contains at least one condition that may meet difficulties while developing and about 21.48% area of blocks contain two or more unfavourable conditions. The most quantities blocks by area are type IV, it contains complex shapes and probably affect the site planning. This type of blocks is usually concaved polygons caused by the in-deep existing alleyways. Type VII blocks also contain this attribution, but their plots are much more subdivided, remaining 11.46% of the total area.

Table 2

The boundary types of blocks in Tainan

Boundary Type	Explanation	Count	Percentage (by count)
A	surrounded all by planned road / plaza	38	5.60%
B	surrounded all by existing alleyway	47	6.93%
C	surrounded by both planned road / plaza and existing alleyways	593	87.46%
	Total	678	100.00%

Source: authors collect

[1] SHI = FP/[2sqrt(Aπ)], FP = perimeter (unit: meter), A = area (unit: square meter)

Table 3

The conceptual typologies of blocks map in Tainan

block type	Attributes	count	Percentage (by count)	Percentage (by area)	Boundary Type		Planned road perimeters percentage
I	shape: simple area: big plot subdivided: less	130	19.17%	30.79%	A: B: C:	23 3 104	57.07%
II	shape: simple area: big plot subdivided: more	36	5.31%	7.01%	A: B: C:	2 2 32	48.02%
III	shape: simple area: small plot subdivided: more	63	9.29%	3.41%	A: B: C:	4 8 51	41.59%
IV	shape: complex area: big plot subdivided: less	113	16.67%	37.30%	A: B: C:	5 2 106	45.92%
V	shape: simple area: small plot subdivided: more	110	16.22%	4.24%	A: B: C:	2 14 94	39.50%
VI	shape: complex area: small plot subdivided: less	33	4.87%	1.45%	A: B: C:	0 3 30	32.84%
VII	shape: complex area: big plot subdivided: more	60	8.85%	11.46%	A: B: C:	2 5 53	43.98%
VIII	shape: complex area: small plot subdivided: more	113	19.63%	4.33%	A: B: C:	0 10 123	38.85%

Source: authors collect

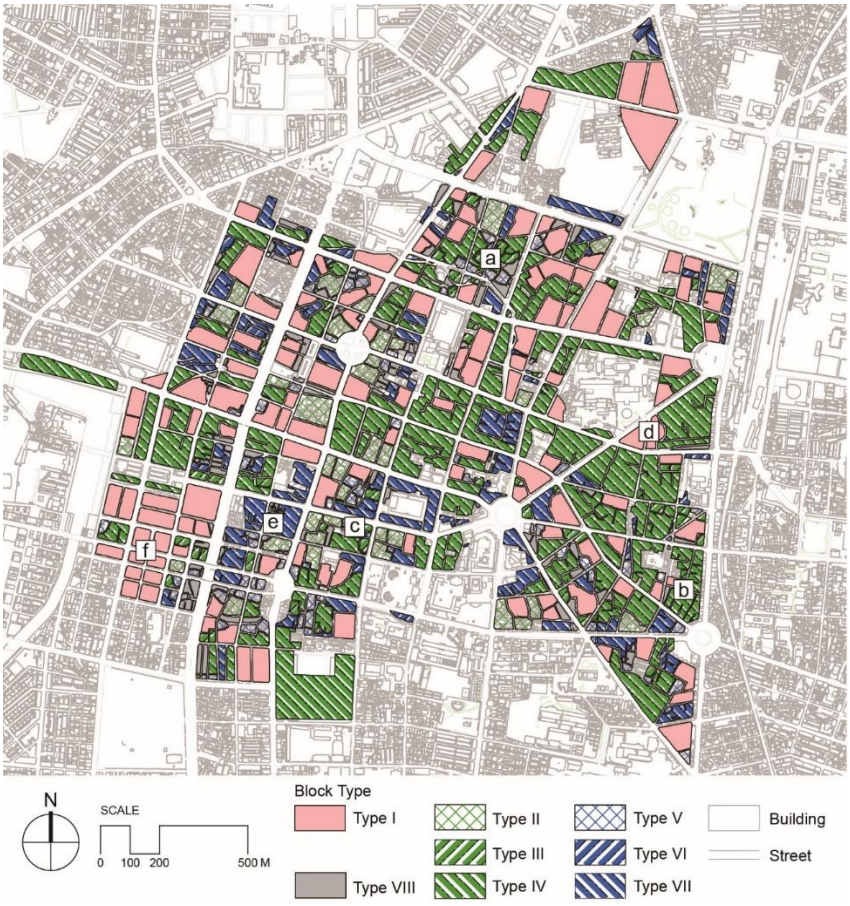

Figure 4. Conceptual typologies of blocks map in Tainan
Source: authors draw refer to Tainan City Government (2006) (2010) (2017), Dept. of Land Administration, M.O.I. (2017), *Construction Management Regulations of Tainan City*

Figure 5. Details of urban blocks in Tainan
Source: authors draw refer to Tainan City Government (2006) (2010) (2017), Dept. of Land Administration, M.O.I. (2017), *Construction Management Regulations of Tainan City*

By observing the form of these blocks, the effect of each planning instrument is easy to carry out. Figure 5 shows the specific area of Figure 6. Figure 5a shows the broad and straight road planned in the second phase forcedly added onto the original tissue made the blocks deformed

over subdivide. The existing alleys with an organic shape overlapped with "boulevard" made the urban blocks small and broken. The plots are also over subdivided and remain the uncompleted building lots on the planned reads site. Figure 5b shows form framed by a building lots setback for road accessibility form existing alleyways. Since an existing alleyway is a kind of road and cannot be a part of a building lot, urban blocks will be cut through and formed a concave polygon. Since the original building lots are relatively small, the shape of urban block seems to be more complex under the calculation of SHI index. Figure 5c and 5d show the opportunities to construct a high-rise building. In phase 2 and 3, plot on the side of planned road trend to replotting or exchange into the neat form to reduce the restriction of construction, so they are much easier to construct a high-rise building under the post-war land-use plan with a high floor area ratio (FAR). The difference between these cases is the size and the plot subdivision. We can see that 5d is a department 13-story department store and the 5d contains 10-story office building. Figure 5e and 5f show the contradiction between the planning instrument of phase 3 and phase 4. Both of them are the "new town" in phase 3. The third phase replotting some area without leaving a road to each plot by the pre-automobile era's regulations also become trouble after the 1970s. With these two leading conflicts, the blocks are over subdivided and difficult to build a building. Figure 5e is the replotted under the regulations of Taiwan Urban Planning Order before WWII. Since a building lot does not require a "road" to satisfy its accessibility, the replotting area will not equip with a road. Therefore, those building lots require many existing alleyways for road access and make the block in a very broken shape and merely unable to construction under the current regulations. Figure 5f had not replotted and construct any buildings before WWII. These blocks are easy for overall development because their block size is smaller and become a hot spot of development in Tainan old town.

Conclusion

The old town Tainan completely ran through the all morphological periods on Taiwan, and its form of blocks shows the resistance of a planned old town. Since more and more people started to focus on and to try to preserve the historical townscape, we do not aspect an old town should develop all into the modernised shape but shall understand its unique spatial context. To preserve an old town is not to keep the current buildings as monuments but to ride on the driving force of urban redevelopment and to continue its townscape.

In summary, this study carries out the morphological frame of Tainan by observing the urban blocks. Urban land-use plan and zoning, building lots and plots are the structural elements of townscape and restricted by historical stratification separately but make systematical obstacles for old town redevelopment under the current "urban architecture" mechanism. The more than 400-year development in Tainan shows the persistence of urban formation, regardless of planning technologies. The most advanced planning instruments in each period were forcedly added onto the original tissue directly and became the redundant conditions today, made the urban blocks over subdivided and constrain the urban development (Rossi, 1966). Somehow this phenomenon helps the historical townscape remains today, it still not a good idea for preserving the old town. It is better to have some other positive actions to strike a balance between the urban redevelopment and historical townscape preservations.

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